

What is claimed is:

1           1.       An optical communication system for amplifying an  
2   optical signal propagating through an optical transmission line  
3   by using an optical amplifier in an optical repeater and emitting  
4   an amplified optical signal to an optical transmission line  
5   mounted at a back stage comprising:

6           a transmission line compensating device to generate control  
7 light for producing a Raman amplification effect within said  
8 optical transmission line based on a control signal superimposed  
9 on said optical signal.

1           2.     The optical communication system according to Claim  
2     1, wherein said transmission line compensating device is so  
3     configured as to send said control light to an optical  
4     transmission line mounted at a front stage.

1           3.     The optical communication system according to Claim  
2     1, wherein said transmission line compensating device is so  
3     configured as to send said control light to said optical  
4     transmission line mounted at said back stage.

1           4.       The optical communication system according to Claim  
2   1, wherein said transmission line compensating device is mounted  
3   inside said optical repeater.

1           5.     The optical communication system according to Claim  
2     1, wherein said transmission line compensating device is  
3     separately and individually outside said optical repeater.

1. *Pharmaceuticals*: The pharmaceutical industry is a major contributor to the economic growth of the United States. It is a highly competitive industry with a high barrier to entry. The industry is characterized by high research and development costs, long time to market, and high prices. The industry is also characterized by a high degree of innovation and a strong focus on patient care.

1           6.     The optical communication system according to Claim  
2     1, wherein said transmission line compensating device includes  
3     two or more control light sources to generate control light having  
4     a different wavelength and output and an optical multiplexer to  
5     multiplex said control light fed from said two or more control  
6     light sources.

1           7.     An optical communication system for amplifying an  
2     optical signal propagating through an upward transmission line  
3     or a downward transmission line by using a corresponding optical  
4     amplifier in an optical repeater and sending an amplified optical  
5     signal to an upward transmission line or a downward transmission  
6     line mounted at a back stage comprising:  
7                 transmission line compensating devices each operating for  
8     said upward transmission line or said downward transmission line  
9     and each generating, based on a control signal superimposed on  
10    said optical signal, control light which causes a Raman  
11    amplification effect in said optical transmission lines.

1           8.     The optical communication system according to Claim  
2     7, wherein said transmission line compensating devices are so  
3     configured as to send said control light to optical transmission  
4     lines mounted at a front stage.

1           9.     The optical communication system according to Claim  
2     7, wherein said transmission line compensating devices are so  
3     configured as to send said control light to said optical  
4     transmission lines mounted at sid back stage.

1           10.    The optical communication system according to Claim  
2   7, wherein said transmission line compensating devices are  
3   mounted inside said optical repeater.

1           11.    The optical communication system according to Claim  
2   7, wherein said transmission line compensating devices are  
3   separately and individually mounted outside said optical  
4   repeater.

1           12.    The optical communication system according to Claim  
2   7, wherein said transmission line compensating devices include  
3   two or more control light sources to generate control light having  
4   a different wavelength and output and an optical multiplexer to  
5   multiplex said control light fed from said two or more control  
6   light sources.

1           13.    The optical communication system according to Claim  
2   7, further comprising common circuits each controlling  
3   simultaneously said transmission line compensating devices each  
4   operating to correspond to said upward transmission line or said  
5   downward transmission line.

1           14.    An optical repeater for amplifying an optical signal  
2   propagating through an optical transmission line by using an  
3   optical amplifier and sending an amplified optical signal to an  
4   optical transmission line mounted at a back stage comprising:  
5        a transmission line compensating device to generate, based  
6   on a control signal superimposed on said optical signal, control  
7   light which causes a Raman amplification effect within said

8 optical transmission line.

1 15. The optical repeater according to Claim 14, wherein  
2 said transmission line compensating device is so configured as  
3 to send said control light to an optical transmission line mounted  
4 at a front stage.

1 16. The optical repeater according to Claim 14, wherein  
2 said transmission line compensating device is so configured as  
3 to send said control light to said optical transmission line  
4 mounted at a back stage.

1 17. The optical repeater according to Claim 14, wherein  
2 said transmission line compensating device is mounted inside said  
3 optical repeater.

1 18. The optical repeater according to Claim 14, wherein  
2 said transmission line compensating device is separately and  
3 individually mounted outside said optical repeater.

1 19. The optical repeater according to Claim 14, said  
2 transmission line compensating device includes two or more  
3 control sources to generate control light having a different  
4 wavelength and output and an optical multiplexer to multiplex said  
5 control light fed from said two or more control light sources.

1 20. An optical repeater for amplifying an optical signal  
2 propagating through an upward transmission line or a downward  
3 transmission line by using a corresponding optical amplifier and

4 sending an amplified optical signal to an upward transmission line  
5 mounted at a back stage or a downward transmission line mounted  
6 at a back stage comprising:

7 transmission line compensating devices each operating for  
8 said upward transmission line or said downward transmission line  
9 and each generating, based on a control signal superimposed on  
10 said optical signal, control light which produces a Raman  
11 amplification effect within said upward transmission line or said  
12 downward transmission line.

1 21. The optical repeater according to Claim 20, wherein  
2 said transmission line compensating devices are so configured as  
3 to send said control light to an optical transmission line mounted  
4 at a front stage.

1 22. The optical repeater according to Claim 20, wherein  
2 said transmission line compensating devices are so configured as  
3 to send said control light to said optical transmission line  
4 mounted at said back stage.

1 23. The optical repeater according to Claim 20, wherein  
2 said transmission line compensating devices are mounted inside  
3 said optical repeater.

1 24. The optical repeater according to Claim 20, wherein  
2 said transmission line compensating devices are separately and  
3 individually mounted outside said optical repeater.

1 25. The optical repeater according to Claim 20, said

2 transmission line compensating devices includes two or more  
3 control sources to generate control light having a different  
4 wavelength and output and an optical multiplexer to multiplex said  
5 control light fed from said two or more control light sources.

1           26.     The optical repeater according to Claim 20, further  
2     comprising common circuits each controlling simultaneously said  
3     transmission line compensating devices each operating to  
4     correspond to said upward transmission line or said downward  
5     transmission line.

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